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The Integrated Archaeological Management System in Cascais, (Portugal): From Management to Public Access

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Cascais City Council is currently developing an integrated information system for cultural heritage which aims to systematize available information from an urban planning and management perspective. This paper explores the project of interconnection between the archaeological assets database and the municipal webGIS, and the potential benefits from public access to this information.

Keywords: Information Systems, Planning, Cultural Heritage.

1. Introduction

Cascais is located in the metropolitan Lisbon area, and is therefore under intense urban pressure. Until the early 20th century, this was essentially a rural area, in which the main locality developed around a modern-era military fortress and around the fishing harbor on the bay. The hinterland was mostly agricultural, with small urban settlements in the fertile areas of stream valleys (CMC, 2003).

At the end of the 19th century, the Portuguese royal family used Cascais as its summer residence. The municipality thus became an important beach resort, altering the occupation of the coast throughout the whole 20th century (SILVA, 1995). The hinterland suffered intense occupation only from the second half of the 20th century onwards, mirroring what took place in all the regions surrounding Lisbon, accentuating at the end of the century with the opening of new roads. (SOARES and DOMINGUES, 2003).

One of the greatest challenges for municipal management in the early 21st century is the compatibility between urban development dynamics and territory occupation respecting cultural heritage. The key for such a challenge is, undoubtedly, planning. Information systems are fundamental in planning tasks, since they allow us to transform *data* into *information* and *knowledge*, thereby supporting effective decision-making.

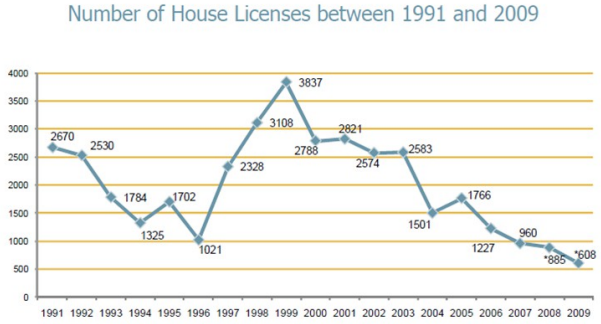

Figure 1: *Evolution of urban building permits in Cascais source http://www.cm-cascais.pt/Cascais/Cascais/Estatisticas.*

In this sense, the Cascais City Council (CMC) sought to integrate two technological tools that it had been using in two discrete areas: the cultural heritage inventory and the geographical information system (GIS). This project brings together the Council's departments of Information System and Urban Planning and companies who develop the *software* used in both processes, mainly Sistemas do Futuro, Multimédia Gestão and Arte e a Lógica, TI Portugal.

2. Structure and technology of information system

Taking inventory of the cultural assets of the municipality of Cascais began in 2003 using the *Inpatrimonium Premium* application, developed by Sistemas do Futuro. Although during its first phase

(until 2006) attention was solely focused on mobile assets under the tutelage of municipal museums, this application was chosen because it was the only solution in the Portuguese market to allow for an integrated management of information pertaining to different typologies of cultural heritage. The array of products traded by *Sistemas do Futuro* contemplates different types of heritage: objects, site-specific, natural and immaterial. The *Premium* version, used by the CMC, combines the first three types.

The application is developed with the constant preoccupation of respecting the international norms defined by the *International Council of Museums*, through its International Committee for Documentation, known as CIDOC (CIDOC, 1995), as well as ensuring that the reference rules for documentation and management of cultural heritage are also considered.

With Microsoft SQL Server as its data engine, the system is based on a relational structure that has as fundamental goals the non-repetition of information records on the same item, as well as safekeeping the history of information belonging to the cultural and natural heritage of the municipality of Cascais.

With this in mind, *Inpatrimonium* is organised in six information repositories divided in the following fashion:

- Inventory: repository of all the information directly related with cultural and natural heritage such as, for example, identification codes, designations, descriptions, locations, dimensions, conservation status, etc.;
- Terminology and thesauri: repository holding terminological tables and thesauri used in data introduction;
- Entities: repository of entities (authors, archaeologists, companies, etc.) either directly or indirectly related with heritage or with any of the other remaining tasks;
- Events: repository of all information records belongingto movements, loans, exhibitions, conservation treatments and other relevant events for the documentation of natural and cultural assets;
- Documents: repository of the information belonging to historical or general management documents that enable a greater knowledge of the assets and give foundation of the recorded information;
- Multimedia: repository of all the digital information associated with the database and subsequently related with any record.

All the records featured in the above-mentioned repositories can be interrelated with any other record existing in the database (fig. 2). This possibility of interrelating all the information, the multi-level description (recently implemented for the site-specific task, which allows for site organization according to a tree of dependencies) and the possibility of connecting the database with other databases are some of the strong points of the application used in Cascais.

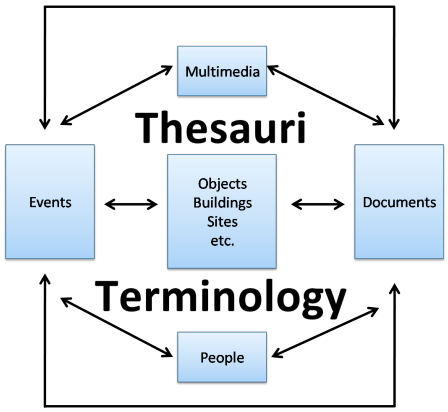

Figure 2: *Structure of the database.*

Given that the City Council also uses a GIS integrating information of other areas of municipal management (urban planning, sports, education, social development, etc.) a solution was sought to allow for the connection between the databases that support both products. This connection aims to eliminate the duplication of information in two different systems, allowing internal users to continue using the adequate tools for management of both types of information, both in data introduction and in database maintenance. The online publication of the results will eventually allow public access through an integrated system.

The final structure of this project (fig. 3) displays its functioning in terms of the articulation between the two applications. At an internal level, municipal workers can, through *Inpatrimonium Premium*, create the identification of any site of cultural interest in the GIS. This is achieved though a series of *web services* that enables the interaction between both databases: record identifiers are kept in each database for subsequent system or internet viewings. GIS features a minimal amount of information on a site without raising the need of viewing the entire record, which will be accessible online through the cultural heritage catalogue.

These two databases are available online in two distinct urls (http://sig.cm-cascais.pt and http://www.cm-cascais.pt/inweb), thus allowing two distinct types of search – geographical and cultural. The connection between databases also provides a link on each platform enabling navigation between the complete set of data stored in each application.

The project was developed along two different stages. Initially, new functionalities were implemented in the back office applications of the two systems. Then, the integration of the two databases was published online, with the possibility of viewing one via the other and vice-versa. The work involved in the adaptation of

InPatrimonium Premium to these new functionalities represented an *added value* not only for City Council, but also for Sistemas de Futuro and its clients who use this technological tool. Throughout the years of collaboration with Sistemas do Futuro, CMC has become an important partner in the development and implementation of new functionalities in the application that will benefit a large group of entities that use this application in Portugal: local authorities, museums, foundations, universities, dioceses, among others. The underlying concern with following international rules and standards, mainly CIDOC CRM (CIDOC, 2010) and SPECTRUM (COLLECTIONS TRUST, 2009) contributed for a uniformization of concepts and procedures in the treatment of information pertaining to cultural assets. This was curiously achieved through a commercial endeavor, in a country where initiatives in this area by the proper authorities are deficient, if not lacking.

The cultural heritage of Cascais is relatively well-known and studied, when compared with most Portuguese municipalities. Among the sites of cultural interest, monuments and archaeological sites stand out, having earned the interest of the international scientific community since the middle of the 20th century (CARVALHO, 1989). The municipality also pioneered the publication of its Archaeological Chart, where all fortuitous archaeological finds in the territory are enumerated and mapped out (CARDOSO, 1991). However, this capital of accumulated information was not always recorded in adequate media or with the necessary systematization in order to be used in planning and territorial organization. The project presented here results precisely from the identification of this need and is centered, firstly, on archaeological heritage, as that is the area in which there are more available data to test and validate the solutions being constructed.

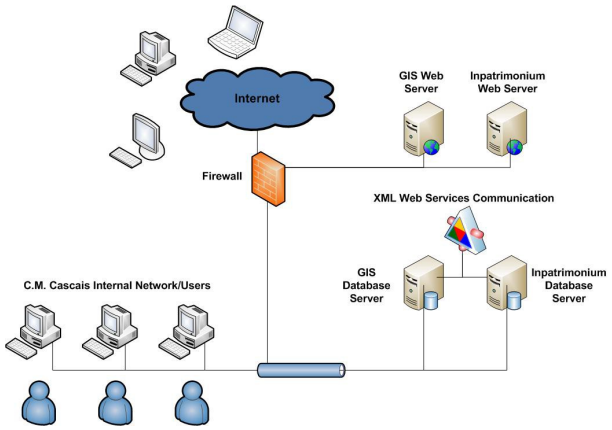

Figure 3: *Final structure of the project.*

All the information that allows for the identification of a site or an object of archaeological interest is inscribed in its respective inventory record. The possibility of relating the information that characterizes the site to other tasks in the database (events, entities and documents) allows for an interrogation of the system, with questions such as: "which objects were found in an archaeological excavation?", "which sites were covered by the study of environmental impact relative to the construction projects promoted by an entity?", "which graphic and photographic material belonging to a site was obtained during certain archaeological intervention?" or "who are the owners of the sites included in a given conservation program?".

The interrelation between this information and the data inserted in GIS (or in other municipal databases also accessible through this platform) represents a very important step in the territorial planning and management. It is a simple method of, without having to search intermediary platforms, knowing which programmed construction works can affect inventoried archaeological sites; the progression of building permits for a specific area; the interface of sites with transportation networks and other infrastructures; the proximity to equipments and services; or even to access statistical data that characterize the demography and types of occupations surrounding a site. In addition, the articulation between the two systems allows geographical parameters to be added to the search criteria and enables the database user to use the tools available in WebGis for the inventoried archaeological sites (calculation of distances or areas, *buffer* creation, etc.).

All these characteristics are fundamental for lighter management and decision procedures by CMC when pursuing the safekeeping, protection and benefit of archaeological heritage, but also represent an opportunity for public dissemination of the information gathered and maintained by City Council. The principles of municipal management transparency are accessible through the WebGisCascais platform, with public internet access since 2007. The information that belongs to cultural heritage is another of the available themes, with the added advantage of the information presented originating form a data structure specifically designed for such objective.

The information made available online through the already mentioned urls (http://sig.cm-cascais.pt e http://www.cm-cascais.pt/inweb) is a simplified version of the data structure of the *Inpatrimonium Premium* application, from which all contents of confidential nature, or protected by copyright, as well as those belonging exclusively to internal management and decision-making, are omitted. However, there is the possibility of requesting additional information (through the indication of an electronic address), whose access is studied on an individual basis.

Public access to the information on archaeological sites in Cascais follows different types of goals. Knowing the history of the human occupation of the territory is, undoubtedly, one of the guiding principles. The interest of non-specialized audiences for archaeological information has many motivations and explanations,

which will not be discussed here. It is however an undeniable fact, to which the Cascais City Council, as an organism of local public administration should not be indifferent. In addition, the existence of archaeological sites (or areas of potential archaeological interest) represents a group of conditionings to the occupation and use of the territory that is important to know, as well as being a potential for a sustainable exploration with, for example, the area of cultural tourism. Public access to this information also contributes to a better management of the expectations of investors and landowners in face of the strategic axis defined by the Local Agenda 21 (AGENDA CASCAIS 21, 2007).

Finally, it is important to reinforce the idea that archaeological heritage is a fundamental aspect for its protection. In our current information society, ideas that in the past advocated the non-dissemination of the precise location and characterization of sites as a manner of preventing eventual threats to this integrity should be abandoned. Today, it is very unlikely that such information can be made accessible only to a restricted group and public dissemination is the best manner of avoiding allegations of ignorance in actions of destruction, vandalism, or poor practices of territory management. The development of this project can contribute to a greater approximation between citizens and their immediate heritage, essential in protection and vigilance by those who live closer to the sites.

In addition to this most immediate dimension, the information fixed within this project is also an important element in the construction of collective memory and identity of a heterogeneous and cosmopolitan population. Identity is increasingly constructed through diversity and cultural heritage plays an important role in the structuring of different social groups. If, during the 20th century, the City council pioneered the gathering of information that was the basis of research and historical interpretation works, it is the management of such information in the perspective of urban planning and management that is now sought, reinforcing archaeological heritage as a structuring factor in the identity of the Cascais area.

For this reason, it is fundamental that the revision of the Cascais Archaeological Chart must be undertaken with the utmost rigor, given that, at this moment, we are not only finding information for historical readings, but conditioning the use and transformation of the territory by those who ultimately benefit from the historical information produced: the population who visit and lives in Cascais.

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